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U.S. DISTRICT COURT  
EASTERN DISTRICT OF MICHIGAN  
SOUTHERN DIVISION  
UNITED STATES,  
Plaintiff,  
vs. Case No. 77-71100  
STATE OF MICHIGAN,  
Defendant.

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PRESENTATION OF THE DWSD GREATER DETROIT  
REGIONAL SYSTEM REPORT  
BEFORE THE HONORABLE JOHN FEIKENS, JUDGE  
Tuesday, August 16, 1994 - Detroit, Michigan

APPEARANCES:

Slide Presentation By: MARK J. TENBROEK, P.E.  
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I N D E X

WITNESS/PROCEEDING:

PAGE:

SLIDE PRESENTATION

By Mr. TenBroek

4

Open Questioning

23

EXHIBITS:

PAGE MARKED:

None.

1 Tuesday, August 16, 1994

2 Detroit, Michigan

3 At or about 9:05 a.m.

4 - - -

5 THE CLERK: The Court calls case number  
6 77-71100, United States of America versus State of  
7 Michigan.

8 THE COURT: Please be seated. Good  
9 morning, everyone. For the purpose of the presentation  
10 of the Regional System Report, I'll call on the Court  
11 Monitor, Dr. Bulkley.

12 DR. BULKLEY: Thank you, your Honor. I  
13 would like to ask for the City of Detroit to make the  
14 presentation. The person that I've worked with most  
15 closely, in terms of development of the model, is  
16 Mr. Figita, but I would recognize representatives from  
17 the City of Detroit; Ms. Levy as the Deputy Director,  
18 and I'll ask them to proceed as they wish.

19 MS. LEVY: I'll just go ahead, your  
20 Honor, and Gary Figita can take over. I don't need to  
21 do any introductions, I don't believe.

22 THE COURT: All right. Please proceed,  
23 Mr. Figita.

24 MR. FIGITA: Thank you. Gary Figita,  
25 White Water operations, Detroit Sewage Department. What

1 you are about to see is a presentation prepared by Camp,  
2 Dresser & McKee, working with the Technical Committee  
3 comprising of representatives from Wayne County, Oakland  
4 County, Macomb County, City of Dearborn, City of  
5 Detroit, MDNR and the Federal Court Monitor.

6 This project has been in the making for three  
7 long years, and I think we've reached consensus, and I  
8 hope we've reached consensus with all the other  
9 representatives on the committee, that as far as what  
10 the model does, what the model is, what the alternatives  
11 show as far as level of CSO control.

12 As far as the presentation, I will turn this  
13 over to Mark TenBroek of Camp, Dresser & McKee.

14 MR. TENBROEK: Your Honor, if it please  
15 the Court, I'd like to move up to the screen and show a  
16 few slides. I've also got some presentation books, and  
17 I guess if anybody else would like to move so they could  
18 see this a little more easily.

19 THE COURT: If you'd like, you can sit in  
20 the jury box here today. It might inspire you one day  
21 to be a juror. Please feel free to sit in the box if  
22 you wish.

23 MR. TENBROEK: By way of introduction,  
24 I'd like to, I guess, mirror Gary's words. This project  
25 has been going for about three years now, and it's been

1 very valuable to me personally and those members of the  
2 Technical Committee who have been involved in this  
3 project.

4 Just a little project history. The original  
5 model was developed just for the City of Detroit in  
6 about 1987. It went through about 1989, and that just  
7 went through waste water treatment plant. What was done  
8 was to provide some basic statistics of what the  
9 overflows were within the City of Detroit specifically.  
10 There was not a great deal of focus on that point, but  
11 at the end of the project in 1989, that coincided with  
12 some renegotiations for the permit for the City of  
13 Detroit and resulted in some contested case hearings in  
14 renegotiating that permit.

15 At the same time, the Federal Courts became  
16 involved in this project, and Dr. Bulkley, who's here  
17 today, became involved on a technical level to do some  
18 fact-finding and try to resolve some of the issues  
19 surrounding the project.

20 One of the first things that Dr. Bulkley did  
21 was he formulated GDRS Technical and Policy Committees.  
22 The focus of those committees were try to understand  
23 what the problems were and to try to provide all the  
24 information to the parties that were involved.

25 As a result of that, we were inclined to

1 expand the model which was developed just for the City  
2 of Detroit, expand it into the suburban areas. That  
3 developed a regional system model, including the  
4 regional areas and other customers in the City of  
5 Detroit. Also, as part of that was to develop a  
6 committee to oversee the technical developments of the  
7 project, make sure all the suburban communities in the  
8 city were satisfied for a technical basis if the  
9 project.

10 The goals of the project itself, which began  
11 about three years ago, was to first of all maintain the  
12 technical committees, keep the people involved in both  
13 the City of Detroit and the suburban communities in  
14 developing the model.

15 The first step was to define or develop what  
16 the system model included, and that was the first order  
17 of business. For that, the hydrologic and hydraulic  
18 model of the collection system, and also for what we're  
19 expecting the estimate of overflows under baseline and  
20 planned improvement conditions to be after a number of  
21 improvements are in place that are currently being  
22 planned and designed.

23 Finally, the project was moved into providing  
24 a number of alternatives, evaluating them, in terms of  
25 their cost, and providing that to the Technical

1 Committee, as well as providing the individual models  
2 that were prepared as part of the project.

3 I'd like to provide a little background of the  
4 collection system itself and what it includes. I've got  
5 a table included in your handout which gives some very  
6 detailed information. Again, this is included in the  
7 final report for the project.

8 As background, the different communities which  
9 we have, different suburban customers include Clinton  
10 Oakland District. Macomb County has two sanitary  
11 districts; South Macomb; Northeast Wayne County, a  
12 district on the east side of the city; Evergreen-  
13 Farmington, Southeast Oakland, again within Oakland;  
14 rouge Valley within Wayne County; and then some  
15 individual communities, such as Farmington, Allen Park,  
16 Centerline, Melvindale, Grosse Pointe Park, Grosse  
17 Pointe Farms, the City of Grosse Pointe and the City of  
18 Dearborn; and finally the City of Detroit which includes  
19 Hamtramck and Highland Park.

20 Now, I've got basic statistics that were  
21 developed in terms of the combined sewage area or CSO.  
22 As you can see, we have some 563,000 acres, roughly 880  
23 square miles. What I'd like to do is I'd like to just  
24 show you in a graph how this is distributed throughout  
25 the different suburban sanitary districts.

1           Again, to the north, we have a couple of major  
2           sanitary areas, and there shown in this green. Again,  
3           about 220 square miles within Macomb County, and 120  
4           square miles with in the Clinton Oakland District in  
5           Oakland County. Again, those are two major sanitary  
6           areas of the north.

7           Also to the north is Evergreen-Farmington,  
8           about 130 square miles. Again the majority of that is  
9           separate sanitary, with a relatively small area  
10          combined. Also to the north is the Southeast Oakland  
11          district, again, about 71 total square miles. For the  
12          east, South Macomb is roughly two-thirds sanitary area,  
13          about 27 square miles, and then Northeast Wayne County,  
14          also to the northeast of the city.

15          To the west is the Rouge Valley System within  
16          Wayne County, about 130 square miles, and again, the  
17          majority of that is served by sanitary sewers. The City  
18          of Dearborn, again a majority of that community is  
19          served by combined sewers, about 20 square miles in  
20          total.

21          In the center of this entire tributary area is  
22          the City of Detroit, which is approximately 139 square  
23          miles. Again, that's all served by combined sewers,  
24          again, for a total of about 232 square miles of CSO  
25          area, about 650 sanitary, for about a total of 880



1 square miles tributary area. It is certainly one of the  
2 largest collection system and treatment system in the  
3 country.

4 Population-wise, I've shown this graph just to  
5 show you how it's distributed. The total tributary area  
6 is roughly 2.9 million people, of that about one-  
7 million, slightly over one-million in the City of  
8 Detroit itself, the remainder of that distributed  
9 through the different suburban districts.

10 In terms of base flows, this is under dry  
11 weather conditions, you can see that the majority,  
12 again, comes from the City of Detroit, roughly 540  
13 gallons per day. Almost half of that is generated in  
14 the City of Detroit. Again, the remainder is  
15 distributed, very similarly to the population, through  
16 the different suburban districts.

17 Again, the focus of this project was to  
18 develop a model to understand how the system is affected  
19 by wet weather whenever it rains, and the way that, that  
20 was done was by developing a series of computer-based  
21 models for a number of these different districts, and  
22 the way that was broken down was providing six different  
23 models, and these correspond to what we call Western  
24 Wayne, which is primarily the Rouge Valley System within  
25 Wayne County, Evergreen-Farmington within Oakland County

1 and Southeast Oakland within Oakland County. Then we've  
2 prepared a model called Foxcreek/East Side, which  
3 included Macomb County and Wayne County to the east. A  
4 separate model for the west side City of Detroit, which  
5 is primarily tributary to the Rouge River, and last we  
6 prepared a model which we called the Central City, which  
7 has all these other models tributary to it.

8 Graphically, this shows the different models  
9 and how they're connected. Again, the central feature  
10 is this area we call the Central City model, and also  
11 shown on this screen and also on the sheet in your  
12 handout shows the major sewers and interceptors that are  
13 included as part of that system. The waste water plant  
14 is included at this location. All the sewers convey  
15 flows down to that point. Overflows occur throughout  
16 the system, primarily along the Detroit River and up  
17 along the Rouge River, which extends in this direction,  
18 lower Rouge in this direction, middle Rouge in that  
19 direction.

20 What I've shown on the screen also is areas  
21 which are served by combined sewers. As you can see  
22 the, the City of Detroit is all combined. Central City  
23 model is primarily served by combined sewers from the  
24 north and Southeast Oakland including Farmington. Off  
25 to the west is the Western-Wayne County system, and off

1 to the east is the Foxcreek East Side submodel. This  
2 formed the basis for all the analyses that we've  
3 prepared for this report to give you an idea of what the  
4 different models were that were included as part of this  
5 project.

6 We have two types; one that's called an event  
7 model, one that's called the continuous model. The  
8 event models are used to calibrate the system to  
9 understand that our models are calibrating property.  
10 During the project, we use it for simulation a short  
11 period of time, a number of days, and what this event  
12 model does is it accurately simulates what the system  
13 hydraulics are.

14 The second set of models are what we call  
15 continuous models, and they're what provide us with  
16 estimates on how frequently we determine the system will  
17 overflow on an annual basis. What they do is provide us  
18 with these estimates of annual overflow, and to do that  
19 we look at simulated long periods of time, in this case,  
20 ten years of rainfall data to see how many overflows and  
21 how much overflows in that ten-year period.

22 We've provided some simplification in the  
23 system hydraulics. In other words, we don't know, and  
24 what we've done is we've used much of the information  
25 generated under the detailed models to simulate how flow

1 splits occur within the system. The long and short of  
2 this is that we use very detailed modeling to understand  
3 how the system works, and we use continuous flows, long-  
4 term, on a long-term basis. This provides a good  
5 estimate of how the system really operates through a  
6 period of time.

7 Throughout the results of this report, we have  
8 focused on what we call capture calculations, how much  
9 of the combined sewage actually reaches the waste water  
10 treatment plants versus how much discharged to the  
11 receiving streams. There's a series of guidelines from  
12 the EPA, in terms of how those different streams are  
13 defined.

14 Within the EPA CSO flow policy, there's a term  
15 called adequate treatment. In other words, if there's a  
16 certain amount of detention, it can be termed adequately  
17 treated. It's not specifically defined in the EPA's  
18 policy. What we've done for these calculations is we've  
19 used 30 minutes of hydraulic detention, and we've  
20 assumed that, that underwent accurate treatment and  
21 whether the demonstration project, which is building  
22 several basins as part of that project, will answer that  
23 question as to whether or not 30 minutes, 45 minutes or  
24 so forth actually provides an adequate treatment, but  
25 for our calculations, we've made the assumption that 30

1 minutes does provide accurate treatment.

2 In our calculations, the combined sewage  
3 overflows base and the combined capping? ? During  
4 periods of wet weather; in other words, flows that are  
5 generated by users of the system. The customers are  
6 included in calculation of the total CSO flows during  
7 wet weather only. We've also found that the number of  
8 wet weather days are based on rainfall variation over  
9 the entire tributary area. As I said before, there's  
10 884 miles throughout the collection system. Rainfall  
11 and wet weather can occur in very small portions of that  
12 system, and as a result, we have more wet weather days  
13 for the entire collection system than you do at just one  
14 point, just because it's so large.

15 Finally, within our calculations, most of our  
16 alternatives allowed for decanting of basins. In other  
17 words, at the end of a storm, after a certain amount of  
18 time has passed, the volume that's in the basins have  
19 been discharged directly to the receiving waters with  
20 the assumption made that they have been adequately  
21 treated. So, these are some of the basic technical  
22 assumptions that have been made in all of our  
23 calculations.

24 I'd like to just give you a quick review of  
25 what the different alternatives were. First of all, we

1 want to look at what conditions were on what we call  
2 baseline, and that's as of last year, 1993. We  
3 collected that because it was very typical as to how the  
4 system was operating before a number of improvements  
5 went on line.

6 The second set of improvements that we focused  
7 on was what we call planned improvements. That's  
8 recently in the north interceptor east arm being placed  
9 on line, the pump being placed on line, and it also  
10 includes a number of basins that are now being planned.  
11 There's a number of basins, as part of the Rouge River  
12 Wet Weather Demonstration, that are hopefully flowing on  
13 rainfall.

14 So, we wanted to see how the system would  
15 operate in what we call the planned improvement  
16 condition. We've also looked at the impact of spatial  
17 rainfall variation on the system. For all this  
18 analysis, we were using the rainfall from one gauge to  
19 perform our simulations. We wanted to understand, if we  
20 had a whole series of rainfalls, what the impact would  
21 be on the results. So, phase one, to understand that.

22 Under the second phase of alternatives now,  
23 since we looked at options for improving performance of  
24 the system, we put these in three categories. One was  
25 under the MDNR proposed permit design criteria, and

1       they're presumptively achieving their standard of  
2       adequate treatment, and we've done that both with  
3       decanting of basins and no decanting of basins; and  
4       second, we looked at a series of other alternatives.  
5       One is using a standard which was developed out of the  
6       Rouge River Remedial Action Plan to see if that's what  
7       the performance of that alternative would be, and then  
8       we looked at three different alternatives, which focused  
9       just on the west side of the City of Detroit.

10               Finally, we looked at a series of operational  
11       controls to see the impact on the collection system.  
12       What I'd like to do is provide the results of those  
13       simulations.

14               On this diagram, what I've shown is the  
15       estimated annual overflows under what we call baseline  
16       conditions. We wanted to understand again what the  
17       current conditions under the standing conditions are,  
18       and what I've provided here are in red, something called  
19       untreated, and in green, something that is adequately  
20       treated in terms of the discharge.

21               So, under current conditions, all of the  
22       overflows from the City of Detroit, roughly some one  
23       billion gallons per year, are not receiving treatment  
24       today. Within Southeast Oakland, they have a basin,  
25       12,000 drain basin, which is a, roughly, one-hundred

1 million gallon discharge. The majority of that achieves  
2 adequate treatment.

3 To the west, we have Evergreen-Farmington,  
4 which has a hundred billion gallons per year  
5 discharging. Again, all of that is currently untreated,  
6 and in the Rouge Valley System, roughly 1.6 billion  
7 gallons. City of Dearborn, about two billion gallons.  
8 Again, none of that today is being treated.

9 What we have off to the east is the South  
10 Macomb District with two basins, Martin and Chapton.  
11 All of their flow is or achieves the adequate criteria,  
12 all achieving treated criteria, and then we have the  
13 Northeast Wayne County. The Mitting River basin is in  
14 that area, roughly 570 million gallons per year.

15 What do we expect to happen once the immediate  
16 improvements are in place, the major improvements at the  
17 waste water plant and the basins, the Wet Weather  
18 Demonstration Project? What you can see within the  
19 City of Detroit is the overflows on an annual basis are  
20 expected to decrease from roughly 21 billion gallons per  
21 year down to something under 14 billion gallons per  
22 year, roughly two-thirds of what they were previously,  
23 and of that portion, roughly a fifth is going to be  
24 adequately treated. So, the remainder, roughly a half  
25 of what it was before, would be termed untreated



1        overflows in 1998. You can also see that there are  
2        major decreases from Evergreen-Farmington. All of their  
3        CSO's are going to be controlled as part of the Rouge  
4        River Wet Weather Demonstration Project, and also you  
5        can see the same performance within Southeast Oakland.

6                Within the Rouge Valley system, there are  
7        decreases in the number of overflows because of  
8        installation of free basins and also because of some  
9        separation work, and within the City of Dearborn, there  
10       are decreases because of the installation of the CSO  
11       tunnel in that area.

12               Now, I talked a minute ago about the different  
13       criteria, what we're looking at for control of the  
14       system, and what I wanted to do was provide an estimate  
15       for how much more storage would be required to achieve  
16       the MDNR's basin design criteria. The areas that are  
17       shown in red are existing in-plan basins. These are  
18       basins that are planned as part of the Rouge River Wet  
19       Weather Demonstration Project, or these are existing  
20       basins that are already in place, and you can see them  
21       scattered around the collection system.

22               In green, you can see the additional basins  
23       that would be required to achieve their standard, and  
24       their standard is complete capture of the one-year, one-  
25       hour storm, the run off from the one-year, one-hour

1 storm, or 30 minutes of detention of a one-year,  
2 ten-hour storm, and as you can see within the City of  
3 Detroit, there are substantial increases in the storage  
4 that would be required, up to somewhere around 950  
5 million gallons of storage.

6 I wanted to take a look at a second standard  
7 that had been used in the past. It's called the Rouge  
8 River Remedial Action Plan, and again, I've shown this  
9 as the same scale as the previous slide. The plant  
10 facility shown in red, and you see that with this  
11 Remedial Action Plan criteria, which is 15 minutes of  
12 detention of a one-year, one-hour storm, we have  
13 substantially less basin construction required, a total  
14 of about something less than two million gallons of  
15 storage within the City of Detroit. This is the second  
16 criteria. I just wanted to show you the relative size  
17 of the storage facilities that would be required to meet  
18 these criteria.

19 Now, I want to present what the cost of  
20 this -- what these different programs would be and how  
21 well they would perform, and so I prepared a series of  
22 graphs. And what we've shown is just the capital cost,  
23 in terms of millions of dollars to implement these  
24 programs, and then I've shown in this case the annual  
25 volume capture along the left-hand side. So, what we

1       see in 1993 under current conditions, last year  
2       conditions were capturing or adequately treating  
3       something about 74 percent of the baseline through  
4       planned improvements.

5               What we're expecting to have in place by 1998,  
6       we expect the overall system capture to be increased to  
7       something over 85 percent. Again, there are some  
8       districts that are above that and some that are below  
9       that percent capture on an annual basis. Based on the  
10      MDNR basin size and criteria, we're up around 99.7  
11      percent capture of the combined sewage flows generated  
12      on an annual basis. Again, that's roughly 2.6 billion  
13      gallons for capital cost for that plan, and just for  
14      your information, the annual cost of that is roughly 28  
15      million dollars per year over a 20-year period.

16             Some other alternatives, the Rouge Remedial  
17      Action Plan placed right here provides a capture of  
18      roughly 96 percent. So, the Remedial Action Plan, which  
19      is this point, provides an annual capture of roughly 96  
20      percent. Again, the cost for that is roughly at about  
21      600 million dollars total cost or about 67 million  
22      dollars per year of a 20-year life.

23             The three other alternatives that we reviewed  
24      primarily impacted the City of Detroit, and again, we  
25      called them the Long West Arm, Short West Arm, and the

1 West Arm Tunnel, and again, they all fall roughly along  
2 the line from the planned improvements to the Rouge  
3 River Remedial Action Plan, and again, they're very  
4 specifically focused on the west side portion of the  
5 City of Detroit, and again, their costs, oh, roughly in  
6 the range of 100 to 160 million dollars.

7 In terms of annual untreated or inadequately  
8 treated overflows, I, in the next graph, showed the same  
9 project, and then showed what the annual overflows or  
10 untreated overflows would be. First of all, a look at  
11 the MDNR basin sizing criteria, and what you can see on  
12 an annual basis, it's roughly -- compared with present  
13 day conditions of roughly 26 billion gallons per year,  
14 again up at that location. The planned improvements are  
15 going to reduce that again significantly again to about  
16 14 billion gallons per year.

17 Now, the funding, we've showed that at zero  
18 cost, because the funding sources for all these planned  
19 improvements are already in place. The Rouge River Wet  
20 Weather Demonstration Project is already providing  
21 funding through the State Revolving Fund, the pump  
22 station DNR and the NIA already in place and funded.  
23 You can see the capital cost for these west arm  
24 alternatives and the decreases in overflows that will  
25 result, and in the Rouge River Remedial Action Plan,

1 will result in roughly 3.7 billion gallons per year of  
2 untreated or inadequately treated overflows at a cost of  
3 again, 630 million dollars.

4 For comparison, what I wanted to do is take  
5 the cost of these two major programs, which covers the  
6 entire tributary area, and put that in terms of --  
7 present that in terms of household costs, and what we  
8 see certainly for the Clinton area and Macomb County,  
9 which don't have any CSO basin requirements, they have  
10 no costs.

11 In the City of Dearborn, roughly \$500.00 per  
12 household per year, and then some other costs, again,  
13 Northeast Wayne at 300, Southeast Oakland at \$170.00 per  
14 year. The Rouge River -- or the Rouge Valley basic  
15 criteria results in, of course, a much lower per  
16 household cost. The City of Detroit under \$100.00 per  
17 household per year, the City of Dearborn at \$55.00,  
18 Northeast Wayne at \$37.00, and Rouge Valley at about  
19 \$25.00 per household. Again, these are costs per  
20 household over the entire area, and that includes both  
21 sanitary and CSO households. That's the results, the  
22 technical results of the project. Again, that's  
23 outlined in a report that was submitted June -- or  
24 prepared on June 30.

25 The conclusions that we've reached is that the

1 models have -- provide a valid estimate of both DWSD and  
2 suburban overflows throughout the system.

3 Again, the technical representatives of both  
4 the suburban areas and the City of Detroit have reviewed  
5 these numbers in depth, and we feel that they provide a  
6 good estimate.

7 The models themselves have been very effective  
8 tools in evaluating the MDNR CSO policies to see what  
9 they mean, in terms of costs and what they mean in terms  
10 of annual overflows, and the understanding of the annual  
11 discharges place the DWSD in a position of strength when  
12 looking at future permit conditions. I think knowledge  
13 is always important to understand what the impact of the  
14 different things are.

15 And finally, technical committee participation  
16 has benefitted all parties.

17 Final recommendations are that there are a lot  
18 of things going on within the river. There's a lot of  
19 separation and rehab work that's being done. Those  
20 updates to the system should be incorporated into future  
21 updates of the model, and again, when these revisions  
22 are made, system-wide alternatives that have already  
23 been evaluated and new alternatives should be evaluated  
24 using that new information.

25 Finally, the Technical Committee has been very

1 helpful in bridging the parties together and discussing  
2 what the relative technical issues are, and that has  
3 been very helpful in getting the results in a meaningful  
4 format. It's been very helpful in enlightening  
5 everybody as to what the pertinent issues are.

6 Final -- Another recommendation is that the  
7 system can be used -- the model system can be used to  
8 evaluate and optimize the City of Detroit system,  
9 collection system, and can be used to repair a CSO  
10 master plan once some CSO program has developed, and  
11 finally the results of the modeling process can be  
12 incorporated into the collection control process. I  
13 think this is important that as time goes by, there  
14 needs to be a tool to manage the control of the system  
15 as rainfall occurs, runoff occurs, to try to minimize  
16 these overflows from the system.

17 Finally, I'd like to just acknowledge the  
18 people that have spent the last several years in the  
19 process. Bob Horvath of Dearborn, Ken Bonin of Macomb  
20 County, Joe Kozma and Jim Pistilli, Vyto Kaunelis and  
21 Joe Goetz of Wayne County, Jonathon Bulkley from Federal  
22 Court and Tom Kneuve and Margie Synk, among others, like  
23 myself, who have been very honored to work on the  
24 project.

25 And that's the presentation. If you have any

1 questions, I'd been happy to answer them.

2 DR. BULKLEY: Mr. TenBroek, would you  
3 comment upon the -- your sense of the status of this  
4 effort? In particular, you made the point of going  
5 from event models to continuous modeling. Can you  
6 characterize the professional sense of this modeling  
7 effort? Is it a routine effort? Is it -- represent  
8 some kind of leading edge, or how would you characterize  
9 that status of the model?

10 MR. TENBROEK: Very frequently event  
11 models have been used in the past to evaluate specific  
12 problems within systems. With new policies coming into  
13 effect with CSO control, continuous modeling is becoming  
14 more and more important and more and more the vehicle to  
15 do those analyses. I feel that the program that has  
16 been put together is very leading edge-based on my  
17 understanding of other models throughout the country.  
18 Continuous modeling is a very leading edge and is  
19 providing a very good tool to understanding what the  
20 overflows are on an annual basis.

21 DR. BULKLEY: Also, I had two other  
22 questions. Could you indicate what the impact, as you  
23 understand it to be, of decanting? You used the term  
24 decanting of basins is or is not permitted. I gathered  
25 from your presentation that your analysis provided for



1       decanting. If that process is not permitted, does the  
2       model, or your understanding -- do you have an  
3       understanding of what the likely impact would be on  
4       other parts of the collection system or treatment  
5       system?

6                   MR. TENBROEK: Decanting has a very large  
7       effect on the waste water treatment plant. As it is  
8       right now, the waste water treatment plant has some  
9       difficulties managing some of the large wet weather  
10      flows that occur there. The more storage that's  
11      provided within the collection system, the more of an  
12      impact it has on the waste water treatment plant.

13                   Our analysis has shown that under the MDNR  
14      criteria, we would move through periods of time  
15      exceeding a month on an annual basis. That's currently  
16      not what they're used to providing treatment for. It  
17      would provide a very large burden on the operation of  
18      that facility, and would have to be thought through very  
19      carefully if decanting were not allowed.

20                   DR. BULKLEY: Finally, Mr. TenBroek, can  
21      you speak to the role of clarification made by the Rouge  
22      River Demonstration Project? And just so everyone is  
23      clear, on how that information is gathered from those  
24      demonstration projects and can be utilized to sharpen  
25      our understanding of the system as a whole or what needs

1 to be done as a whole?

2 MR. TENBROEK: As I stated early on, one  
3 of our assumptions was that if 30 minutes of hydraulic  
4 detention of water is in a basin for 30 minutes, it's  
5 going to be adequately treated, to answer the question  
6 of how much detention is really required, so we don't  
7 provide negative impacts to the Rouge River.

8 For example, when those basins are completed,  
9 when the study has been done on the effectiveness of  
10 those facilities, I think a more -- a better estimate of  
11 what adequate treatment really means can be made. For  
12 now, 30 minutes is probably a good estimate, and it is  
13 adequate for the work that we're doing, because we're  
14 comparing different alternatives, but I think the  
15 results of the Rouge River Demonstration are really  
16 needed to address the adequate treatment from the  
17 system.

18 DR. BULKLEY: Thank you, Mr. TenBroek.  
19 Your Honor, I have no further questions.

20 THE COURT: Are there any questions from  
21 any of you? Yes?

22 MR. COON: Mr. George W. Coon, Oakland  
23 County Drain Commissioner. I just want to get up on  
24 speed of the great process that is made in the treatment  
25 plant. As I recall earlier, Judge Feikens and

1 Dr. Bulkley had inquired about this, and it was 47  
2 million gallons per day sanitary sewage coming through  
3 the treatment plant.

4 As I recall editorials in the Free Press,  
5 which singled Detroit out as the largest polluter in the  
6 nation, 450 million gallons is going directly into the  
7 river. Primary and secondary, that number has graduated  
8 up around 800 million gallons per day today.

9 Now, just reviewing the bidding, are we at  
10 total treatment of the whole 800 million gallons a day,  
11 or can Detroit indicate how much, if any raw sewage is  
12 being bumped into the Detroit River? Because those were  
13 the days that EPA singled out Detroit as the single  
14 largest polluter in Michigan, and, of course, your Honor  
15 took receivership control, and we made vast improvements  
16 to the system.

17 So, I just wonder what the condition is on  
18 total treatment of all the sanitary flow and the numbers  
19 that are going on today.

20 MR. FIGITA: At this time, the Detroit  
21 Waste Water Treatment Plant has full treatment to flows  
22 up to 859 million gallons a day. I'm not sure if EPA  
23 did characterize Detroit back in the '70's as being the  
24 largest polluter in the nation, but when you put 1.2  
25 billion gallons of flow into one single-sided plant, I'm

1 not sure we would dispute that, when you put all that  
2 sewage into one plant.

3 So, but we do have at this point in time  
4 primary treatment capacity up to about 1.5 billion  
5 gallons per day and full treatment of 859. I'm not sure  
6 if I answered Mr. Coon's question?

7 MR. COON: Just tell me how many -- Is  
8 there any numbers that you know of that are going  
9 directly into the river? What's the history of the  
10 past? And I'll FAX you editorials from the 1970's that  
11 say what I'm asking the question on and some headlines  
12 that say about EPA singling out Detroit as the largest,  
13 but whether they were or not, I don't know.

14 MR. TENBROEK: Well, the only information  
15 or data that we have regarding the volume of CSO's from  
16 the Detroit system is based strictly on the model, the  
17 annual average estimate for combined sewer overflows.  
18 It is anticipated in the next few years that Detroit  
19 will have the facility to monitor CSO's from all of  
20 its -- most of, if not all of its 67 CSO's, through  
21 instruments under PC6F3.

22 THE COURT: Would you comment on that,  
23 too, on the question that Mr. Coon raised?

24 MR. TENBROEK: Yes. It's certainly my  
25 understanding, Mr. Coon, that the -- to the best of my

1 knowledge, that the Detroit Waste Water Treatment Plant  
2 is in full compliance with both wear emissions and water  
3 emissions, and has been in such compliance for some  
4 period of time, and what we're not focusing on are these  
5 overflows which reach receiving waters before the flows  
6 actually reach the waste water treatment plant.

7 It's my understanding that flows which reach  
8 the waste water treatment plant, any flow up to 859  
9 million gallons a day receives full, primary and  
10 secondary treatment, and those flows in excess of 859  
11 million gallons a day which reach the treatment plant up  
12 to a flow between 1.2 and 1.5 billion gallons a day  
13 receive primary treatment, and then disinfection prior  
14 to discharge to the Detroit River.

15 So, in my professional opinion, the treatment  
16 plant is performing as designed and in compliance with  
17 all Federal and State Regulations that are in place at  
18 the present time.

19 THE COURT: Any other questions?

20 MR. COON: I appreciate that, because  
21 that's the effort that's been made through this Court,  
22 your Honor, since about 1977, that updating analysis,  
23 and I know we had a long way to go on the CSO.

24 THE COURT: Well, I don't know whether or  
25 not you are giving me a lead line into tooting a horn

1 here or not, but I'll take the opportunity nonetheless,  
2 and that is if there's anything that the City of Detroit  
3 can brag about more than the accomplishment of the  
4 Detroit Water and Treatment System in the last decade, I  
5 don't know what it is.

6 I often thought that Mayor Young should have  
7 been more optimistic about his statements with regard to  
8 what the treatment plant was really doing, but he kept a  
9 low profile on that. I think it is a remarkable story  
10 and accomplishment of this waste water treatment system.

11 Any other questions?

12 MR. LOWE: Good morning. My name is  
13 Ronald Lowe. I appear on behalf of the City of  
14 Plymouth. By way of background, the City of Plymouth is  
15 totally surrounded by the township of Plymouth, and  
16 there's been some combined sewer flow through the city.  
17 It's my understanding that because Plymouth Township is  
18 contracted with Ypsilanti waste water, that we are  
19 separating the system so that we'll no longer be a  
20 combined flow through the City of Plymouth with Plymouth  
21 Township. And the metering that we've put in, it's my  
22 understanding that the City of Plymouth will not exceed  
23 its contracted flow, permitted flow of sewage, and I  
24 guess what I'm asking here at this point is, is there --  
25 will the City of Plymouth be exempted from having to pay

1 for any of these additional costs, because it will be in  
2 a position to only providing a flow that is contracted  
3 for and paid for?

4 MR. TENBROEK: I don't think the results  
5 of this study had even thought to address who pays for  
6 what, only to provide broad ranges of what these  
7 alternatives are going to cost. It says nothing about  
8 how those costs might be distributed through the  
9 different communities, if they were to be provided.

10 MR. LOWE: But your study does allocate  
11 the cost across my households at the present time.

12 MR. TENBROEK: The only intent is to show  
13 relative cost by districts to provide CSO control. In  
14 fact, Plymouth Township would remove their CSO flows,  
15 and depending on how costs are allocated, may not have  
16 to pay anything whatsoever. It may be allocated to only  
17 those CSO customers that are involved. I do not know  
18 that.

19 MR. LOWE: Do we have any idea when we  
20 might by getting to address a question like that?

21 DR. BULKLEY: I think the results of this  
22 Rouge River Demonstration Project are of critical  
23 importance to know how we're going to proceed, in terms  
24 of the technical capabilities, to handle combined sewer  
25 overflows throughout the combined basins and throughout

1 the service areas.

2 So, from my view, that information will become  
3 available when we know the results the National Wet  
4 Weather Demonstration projects, and are able to proceed  
5 with the corrections needed to correct whatever the  
6 national and state policies are for wet weather  
7 conditions.

8 MR. LOWE: Well, let's take a  
9 hypothetical. In your view, if the City of Plymouth can  
10 demonstrate it's not exceeding its contracted gross  
11 rate, will the City of Plymouth be exempted from paying  
12 any additional costs from this?

13 DR. BULKLEY: I tend to feel I should not  
14 speculate about that issue. I'd rather wait until we  
15 have the facts before us, and then deal with the  
16 concrete information as it's available. That would be  
17 my response, sir.

18 MR. LOWE: Okay. Thank you.

19 THE COURT: Would there not be -- Would  
20 there not be a question as to whether or not the people  
21 that you're referring to receive a special benefit, as  
22 that special benefit is defined in Michigan Law, to  
23 determine whether or not they should make any payment?

24 MR. LOWE: Perhaps the Court can  
25 enlighten me as to the special benefit that they will be



1 receiving.

2 THE COURT: I'll be glad to send you a  
3 copy of an opinion that just came out in the case of a  
4 suit by several taxpayers, Mr. Coon, in your area. That  
5 township again was what?

6 MR. COON: Bloomfield Township.

7 THE COURT: Pardon?

8 MR. COON: It was Bloomfield Township.  
9 SAD, special assistant district.

10 THE COURT: A number of taxpayers in the  
11 Bloomfield Township took the position that they were  
12 receiving no special benefit of a determination of a  
13 basin that serviced that area would provide, so far as  
14 they were concerned.

15 I held otherwise under the facts that were  
16 developed in that case, and held that there was a  
17 special benefit. Of course, beyond that, it's the  
18 question of portionality that has to be decided by  
19 either the tax tribunal or perhaps the Circuit Court,  
20 because even though there is a special benefit that  
21 householders may have in a township such as Bloomfield,  
22 in relationship to other benefits that are given to  
23 other residents of that township, because of a higher  
24 need for the basin as it applies to them, the  
25 portionality, the law would require perhaps a lesser

1 assessment.

2 You're asking a question that seems to me that  
3 can only be decided after the facts have been developed.  
4 You say -- This is hypothetical, this question you're  
5 asking; is it not?

6 MR. LOWE: The question I presented to --  
7 Yes, but the situation is, your Honor, it has been my  
8 understanding from the people -- the administration in  
9 the City of Plymouth that we haven't exceeded flows.  
10 The metering and particularly this division with  
11 Plymouth Township, we hope to demonstrate conclusively  
12 with the meter flows that we have not exceeded the flows  
13 that we've contracted for and paid for.

14 THE COURT: Well, it may be quite  
15 significant as a fact.

16 MR. LOWE: But we can cross the bridge  
17 when we need to, but I would like to see your opinion,  
18 your Honor, because that would help me prepare down the  
19 line.

20 THE COURT: If you'll leave your name and  
21 address with the clerk in chambers, I'll be glad to send  
22 that out.

23 Any other comments? Mr. Henshen?

24 MR. HENSHEN: Good morning. Richard  
25 Henshen, consultant for the City of Detroit. One, I

1 think a key item that I think hasn't emerged in the  
2 presentation that I just wanted to bring to your  
3 attention, your Honor, is the application of this model  
4 as we move forward.

5 As you know, we had an extensive dispute in  
6 the last round of permitting as to what capital  
7 improvements were and how fast they needed to be built.  
8 Setting that dispute aside, while we engaged in short-  
9 term instruction of the immediate improvements, and I  
10 think as Mr. TenBroek has shown to us, immediate  
11 improvements will result in a quantum jump in capture  
12 and treatment, and the question that is still on the  
13 table is how much beyond the tables should we go, and  
14 how much will it cost?

15 One of the key reasons for spending the time  
16 and the money, from my perspective, has been that we do  
17 have a July 1, '96 deadline in the permit that has been  
18 agreed to for preparation of the long-term CSO plan,  
19 which will be the road map for what goes on beyond the  
20 short-term improvements that are factored into the  
21 model, and I think, as you can see from the cost curves,  
22 there's a diminishing return, as you can expect, in  
23 terms of what you pay and what you get, and I think what  
24 we are about to engage in using the model as a pivotal  
25 tool to select a point on that curve or perhaps a set of

1 points for various subareas that will add up to a  
2 long-term CSO plan that the system can afford and will  
3 give us the maximum amount of capture and protection.

4 I think what's clear from the model results is  
5 that there's a wide range, both of cost and performance,  
6 and as we set the stage for that planning, we need to  
7 keep in mind the issues that have been raised about  
8 distribution allocations cost and so on and so forth,  
9 but the big question will be what additional caps will  
10 be taken, and the model will give us the right  
11 ingredients to select the capital improvements.

12 THE COURT: Well, so much of what's  
13 contained in this study is based, in my opinion, on the  
14 leadership that's being given by the entire district to  
15 the development of this, so that the regulatory agencies  
16 can be educated, as all of the rest of us, into what the  
17 problems and costs are. I think that's significant. I  
18 would think that both the MDNR and the EPA ought to find  
19 a great source of helpful information in this study and  
20 in the projections in determining how together we can go  
21 forward in this project.

22 MR. HENSHEN: I think both agencies have  
23 exhibited a keen interest in its development and  
24 application.

25 THE COURT: But my hat's off to the

1 system that gave birth to this idea.

2 Any other questions or comments? Doctor?

3 DR. BULKLEY: Your Honor, I would really  
4 like to acknowledge for the record the efforts made by  
5 the City and all of the regulatory agencies, the  
6 communities, the leadership provided by Camp, Dresser,  
7 particularly Mr. TenBroek. Without that leadership and  
8 cooperation, we'd never get accomplished what has been  
9 accomplished, and I think they all deserve to be  
10 recognized.

11 THE COURT: Let me ask a question that  
12 perhaps is apart from and not focused on -- in the  
13 studies in the hydraulic model, but it seems to me that  
14 there is certainly a strong argument that can be made  
15 that in the attack on combined sewer overflow, the  
16 solution that seems to be preferred is the detention  
17 basin solution, rather than the separated sewer  
18 solution.

19 For example, it would be completely  
20 unrealistic to think that the City of Detroit could go  
21 into a separated sewer system at this stage, but with  
22 regard to the other communities in the system, direction  
23 certainly is in the way of detention basins; is it not,  
24 rather than through --

25 DR. BULKLEY: I think their examples,

1       that, that question is addressed on a case-by-case  
2       basis, and we have some examples in the National Wet  
3       Weather Demonstration Project where sewer separation is  
4       the preferred alternative. It depends upon the  
5       engineering conditions that are found at the specific  
6       site. So, there are examples of separation that is  
7       being implemented.

8               THE COURT: Now, will the continuing  
9       studies reflect that?

10              MR. TENBROEK: I think that we've looked  
11       at some general criteria, design criteria, and in  
12       general, basins are most cost-effective, especially  
13       where large areas are concerned. Many of the  
14       separations in Wayne County or for smaller areas where  
15       it may have been partially separated, and then it may be  
16       cost-effective.

17              The other side of the issue is that once you  
18       separate, you still have to deal with storm water, and  
19       there are storm water regulations that have to be met or  
20       will have to be met in the future. So, one way or the  
21       other, the runoff water has to be dealt with, separation  
22       and the costs for that.

23              THE COURT: As Dr. Bulkley suggests, on a  
24       case-by-case approach?

25              MR. TENBROEK: Well, I think the planning

1 efforts so far have been more master planning. I think  
2 when you get to detail, you can look at that more  
3 closely. At a higher level like this, when we're  
4 talking 260 square miles of CSO, we'd probably have to  
5 focus on all basins versus all separations, and if  
6 they're most cost-effective in design, that's probably  
7 what will be done in this case.

8 THE COURT: Will this hydraulic model  
9 study on a continuing basis point in any way to the  
10 advisability of dealing with these problems on a water  
11 shed basis?

12 DR. BULKLEY: In my view, the work in the  
13 Rouge water shed provides such an opportunity, and that  
14 is under act and consideration at the present time. I  
15 think there are many advantages to thinking about a  
16 water shed approach, treating the entire water shed as a  
17 system, and in my view, this model, while it extends  
18 beyond the Rouge water shed, still can help serve that  
19 function, your Honor.

20 THE COURT: I'm interested. Are there  
21 any -- Are there any persons here who have any thoughts  
22 with regard to the ultimate approach to the solution of  
23 these overall problems on a water shed basin -- basis?  
24 Not a basin, on a water shed basis? That continues to  
25 be the tantalizing idea in the handling of the River

1 Rouge Wet Demonstration Project, and that is ultimately  
2 the River Rouge water shed will be the entity which --  
3 through which the permits can be developed and through  
4 which the solutions to these wet weather flows can be  
5 accomplished? Do you have any comment on that?

6 MR. MURRAY: Your Honor, my name is James  
7 Murray, Wayne County. You've asked a couple of  
8 questions on the advisability of separation over  
9 detention.

10 Some communities -- it's just obvious that  
11 you're not going to separate some communities or flows  
12 really in light of some public sentiment that how can  
13 you do anything other than separate. The project that  
14 is currently being performed under the national  
15 demonstration project and that have State and Federal  
16 permits will answer that question or make more definite  
17 what is the trade-off between separation and the storm  
18 water impact that you're going to have to deal with in  
19 the river.

20 Wayne County has indicated if we were to  
21 follow the one extreme proposal that MDNR had said is  
22 the presumptive fix on CSO and spend a lot of money  
23 according to the MDNR model, that the actual increase in  
24 the use of the Rouge River would -- in my estimation,  
25 wouldn't increase several seconds, if at all, because no



1 points source have been demonstrated to be a continuing  
2 problem evidenced by the Lake St. Claire problems that  
3 we're having right now.

4 So, the national demonstration project is an  
5 attempt to quantify what are the storm water and CSO  
6 choices and how do we maximize those choices, and also  
7 the Great Lakes water shed that we're putting these in.

8 So, that information should be -- will be in  
9 the -- will be a part, in my estimation, for the  
10 regulatory body to move ahead, and we, as citizens, will  
11 have to address, and we're doing that in a comprehensive  
12 way.

13 I think what Detroit has done with this model  
14 is a monument on how we make these kinds of choices, and  
15 the Rouge River has picked up that and extended it to  
16 the whole valley, and those range of choices that are in  
17 that range control option. There are a lot of citizens  
18 that we are dealing with that say you ought to just  
19 separate. We just know that if you take sanitary sewage  
20 and remove the storm water from it or vice-versa, you  
21 can see that, that has a huge cost to do that  
22 mechanically, and there might not be any improvements,  
23 and the receiving water could be far less desirous than  
24 if you left it combined.

25 To give you one estimate of that, on Milk

1 River, we had a small rural detention basin in a  
2 combined sewer area, a small detention basin, three to  
3 five minutes it would overflow. It has no disinfection  
4 at all. We have made half the improvement. We went  
5 from hundred four million gallons at Milk River. We're  
6 going to 18 million gallons of storage treatment. We've  
7 have finished the first tank, which is about 14 million  
8 dollars. That tank, in its operation, before be we can  
9 get the other one done, has reduced our overflow from  
10 six to eight a year down to two. We were modeling a  
11 greater discharge than just two for this period of time  
12 that we're in, but only through August essentially or  
13 almost through August.

14 So, when we finish that project, we're  
15 estimating that we can get ten to twelve treatments over  
16 the year. That treatment has to meet water standards  
17 for discharge, and if we had separated, instead of  
18 spending 230 million, we would have spent 90 million.  
19 We would have gone into lengthy contracts with Detroit  
20 about increased flows to Detroit, and then had have to  
21 deal with the storm water that would continue to go in  
22 to Milk River that would be contaminated.

23 So, we think that the community has made a  
24 very wise choice, and we're evidencing the choices that  
25 we've made.

1                   So in that, your Honor, I think that it is  
2                   wise for us all to learn the facts before we come to any  
3                   conclusions about the best choices and how we're going  
4                   to pay for them. Thank you.

5                   THE COURT: Thank you. Anyone else?  
6                   Dr. Bulkley, you perhaps?

7                   DR. BULKLEY: No, your Honor.

8                   THE COURT: All right. Then we'll stand  
9                   in recess.

10   (Proceedings concluded at  
11   10:15 a.m.)

12   - - -

1       STATE OF MICHIGAN   )  
                                  )    SS  
2       COUNTY OF OAKLAND   )

3  
4       I do hereby certify that I have recorded  
5       stenographically the proceedings had and testimony taken  
6       in the above entitled matter at the time and place  
7       hereinbefore set forth, and that the foregoing is a  
8       full, true and correct transcript of proceedings had in  
9       the above entitled matter; and I do further certify that  
10      the foregoing transcript has been prepared by me or  
11      under my direction.

12  
13  
14                               *Shaun M. Quinn*  
15                               SHAUN M. QUINN  
16                               CSR-4252, New Century Court Reporting  
                              Notary Public, Oakland County, Michigan

17      My Commission Expires:  
18      August 18, 1998  
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